

Cyanuric Acid: All things in moderation

By: Vance D. Fiegel, Co-Founder and Chief Scientific Officer

With the summer outdoor pool season coming up, I thought a short discussion on the use of cyanuric acid (CYA) in swimming pools is in order. CYA is used in outdoor pools to prevent UV light degradation of chlorine and thereby help maintain chlorine levels. CYA is supplied and used as a stand alone chemical and is also a major component of the “stabilized” chlorine products, dichlor and trichlor. While CYA is widely used, its effects on pool water are not widely understood.

When used in moderation, CYA can help maintain chlorine levels in outdoor pools. However, the use of CYA at even modest levels has a significant downside; it inhibits the ability of chlorine to kill bacteria and increases kill time. Maintaining CYA at low levels in swimming pools can be difficult because the concentration of CYA builds over time. CYA does not evaporate and is not used up in performing its function. This can lead to a significant build up of the CYA concentration over time, especially if using dichlor or trichlor. For this reason, dichlor and trichlor should not be used in spas and indoor pools.

Though CYA levels of even a few ppm has an effect on chlorine function, it is clear that levels above 20-25ppm have a significant effect on the disinfection effectiveness of chlorine. While this effect is significantly detrimental in the killing of typical pool bacteria, it is particularly detrimental to the killing of algae and the inactivation of cryptosporidium during hyperchlorination conditions. In pools using any type of CYA, it is absolutely necessary to periodically monitor CYA levels and prevent high levels from accumulating in the pool water. If the CYA concentration reaches higher levels that are detrimental to chlorine disinfection, the only solution is to partially drain the pool and add fresh makeup water to reduce the CYA concentration

When using PoolMoss[®] and PoolMoss[®] Pro in residential and commercial outdoor pools, CWS has specific recommendations for the use of CYA. In northern climates, a low level (5ppm) of CYA can be used, if needed, for the first couple of weeks after start up. Once the water has been treated with The Moss[™] for a few weeks, further use of CYA should be unnecessary to maintain desired free available chlorine (FAC) levels. For pools in warmer, more southern climates where pools are maintained year-round, a low level (10ppm) may be needed to maintain FAC levels throughout the pool season. In either case, it is important to monitor CYA levels by periodic testing to assure that CYA levels are kept low.

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Does LSI Predict Scaling or Corrosion in ProMoss™ Treated Water Systems?

By: David R. Knighton MD, Co-Founder, President and Chief Executive Officer

What is the Langlier Saturation Index (LSI)?

The LSI is a simple calculation developed by a boiler engineer to try and predict whether calcium will form scale or water will become corrosive. It is based on the false assumption that all scale formation is due only to saturation and that the water is in direct contact with the metallic surface.

It is easy to use, simple to calculate, and is used by chemical companies and water treatment companies to predict scale or corrosion and monitor their treatment plans.

Does it work?

In an idealized, laboratory controlled situation, it works for calcium carbonate scaling. In the real world it is not predictive because there are many types of scale other than calcium carbonate, scale formation has a biologic component, and corrosion is predominately a biologic phenomena.

Are there any examples of LSI being predictive of scale formation on ProMoss™?

Many – here's one

- 3M used ProMoss™ along with their chemical program at their corporate headquarters. The LSI became positive over the summer.
- Towards the middle of the summer the water treatment company sent an email to 3M concerning the LSI of +2. They predicted that the chiller was scaling due to lower calcium levels and positive LSI. No changes were made.
- The chiller was opened at the end of the cooling season for cleaning.

The only visible scale formation was on the zinc anodes



Scoping the tubes showed no scale or corrosion
The scale was analyzed and was zinc oxide

Does ProMoss™ affect the LSI?

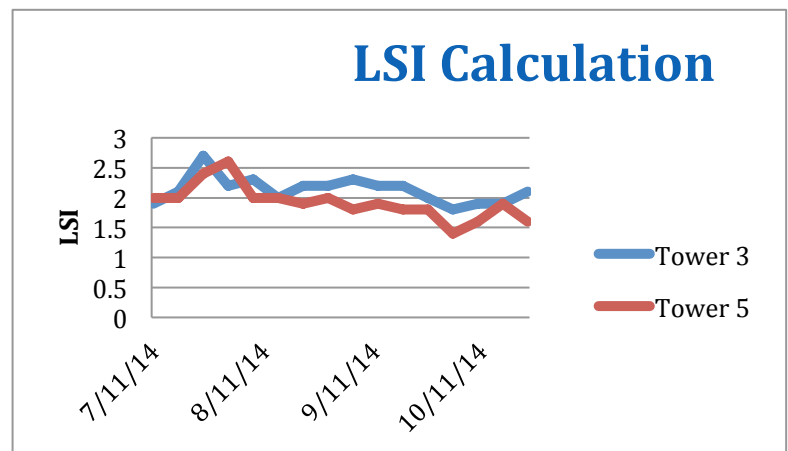
Yes:

- ProMoss™ slightly acidifies the water
- ProMoss™ lowers calcium concentration by removing calcium ions from the water resulting in a positive LSI

Should I be concerned if the LSI becomes positive or negative while on ProMoss™?

No:

- ProMoss™ inhibits and removes scale formation by promoting flocculation and absorbing positively charged ions from the water.
- ProMoss™ inhibits organic contamination formation that acts as a nucleation site for microscopic crystal formation and glues the crystals together to form scale.
- ProMoss™ inhibits corrosion by removing and inhibiting the formation of organic contamination that contributes to MIC.



Chiller treated with ProMoss™ after opening with no cleaning

